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THREE MORE EXAMPLES OF ABNORMAL SEGMENTATION OF THE ABDOMEN IN *NEOBISIUM CARPATICUM* BEIER, 1934 (ARACHNIDA: PSEUDOSCORPIONES: NEOBISIIDAE)

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Abstract.—Teratological variation in the structure of the abdominal sclerites is reported in three examples of the pseudoscorpion *Neobisium carpaticum* Beier, 1934. The following aberrations of the tergites and sternites are established: hemimery, hemiatrophy, symphysomery, and enlargement of the sclerites, as well as various combinations of these. The pathomorphology and possible origin of the anomalies studied are briefly discussed.

According to Ćurčić et al. (1981), examples of abnormal abdominal segmentation in the Neobisiidae are very sparse in the literature; one of these, a specimen of *Neobisium erythrodactylum* (L. Koch) was mentioned by Kästner (1927). A number of anomalous adult *N. maritimum* (Leach) and *N. muscorum* (Leach) were recorded by Pedder (1965). Only recently, surveys of such abnormalities established to date in different species of pseudoscorpions and descriptions of further anomalies in *N. carpaticum* Beier, *N. fuscimanum* C. L. Koch, and *Roncus lubricus* L. Koch were given by Ćurčić (1980), Ćurčić and Dimitrijević (*in press*), and Ćurčić et al. (*in press*).

Materials and Methods

In a collection of 247 adult *N. carpaticum* made at Čarapićev Brest, Mt. Avala, near Belgrade, Yugoslavia, during October 1981, on an area of about five square meters, three specimens with abnormally segmented abdomens were found; these were obtained by sieving leaf litter in a mixed beech and oak forest. In a subsequent collection of 100 adult specimens from the same area made in November 1981, no specimens showing segmental anomalies were found. In two out of the three abnormal specimens collected in October 1981, both the abdominal tergites and sternites were affected, while in the third pseudoscorpion only the tergites were anomalous, the sternites being normal.

Results

Details of the three abnormal specimens of *N. carpaticum* are as follows:

1. Female (Fig. 1). All tergites, except for the first, are anomalous. Thus, tergite II lacks the mid-region and also lacks pigmentation and setae; tergite III has only the right half, while the left half is missing. The following tergite (IV) is represented by two small sections, one on each side; tergite V is enlarged and fills the place

of the missing parts of tergite IV. Tergites VI and VII are fused on the right, while on the left a small section of tergite VII is unattached. Tergite VIII is damaged on the left, while tergites IX and X are fused from the right to the mid-region.

The chaetotaxy (number and arrangement of setae) of the tergites, except for that of tergite I, is drastically disturbed. In this specimen, the abdominal sternites are normal.

2. Male (Fig. 2). The posterior tergites (Fig. 2A) and sternites (Fig. 2B) are affected by different abnormalities. Thus, tergites VI and VII are fused on the right; the case is similar with tergites VIII–X, which, in addition, are partially reduced on the right. The setal formula of the tergites mentioned is significantly disturbed.

In the same specimen (Fig. 2B), sternite VIII is partially fused on the right with sternite IX; the mid-region of sternite VIII is clearly missing. Sternites IX and X are partially atrophied on the right. Sternites X and XI and tergite XI are fused on the left.

The setal formula of all the anomalous sternites is altered as a result of the abnormalities identified.

3. Female (Fig. 3). In this specimen, the posterior sclerites are also affected by anomalies. Tergite IX is fused with tergites X and XI and with sternite XI, and so their setal formula is disturbed (Fig. 3A). Apart from this, tergite X is reduced and represented by one tergal section on the right.

Sternites VII–IX of the same specimen are fused on the left (Fig. 3B). The arrangement and number of setae on these sternites are altered particularly on the left.

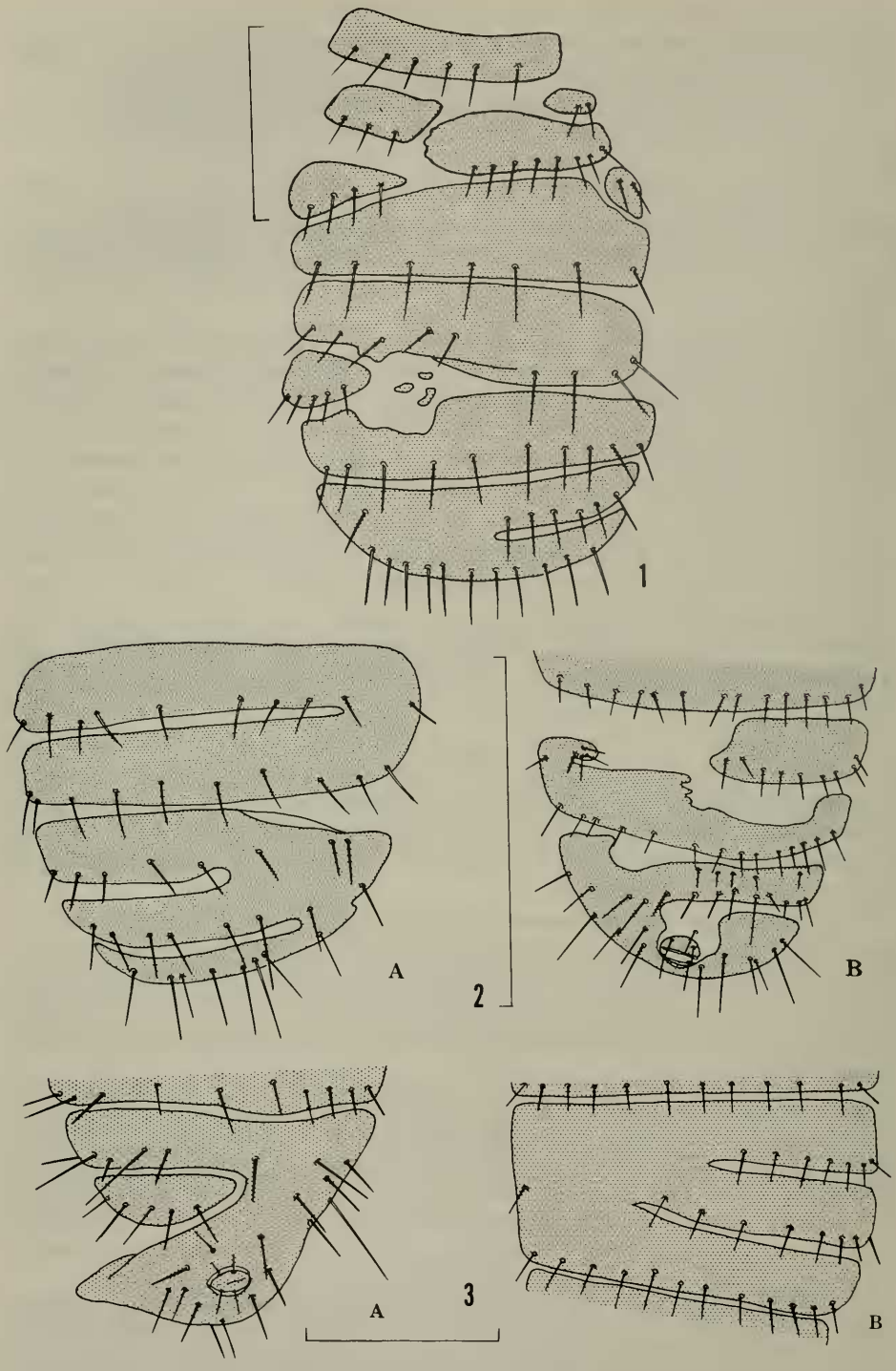
Discussion

Pseudoscorpions with anomalies of the abdominal sclerites constitute 1.16% of the sample of adults collected on Mt. Avala. This is in accordance with the proportion of aberrant specimens in population samples of *N. carpaticum* in other localities (Ćurčić et al., *in press*).

Of the three aberrant specimens of this species of pseudoscorpion, two are females and one a male. Ćurčić and Dimitrijević (*in press*) have found, however, that these anomalies mainly occur in the males of *N. carpaticum*. It thus remains to be investigated, in a greater number of population samples of this species from various localities, the assumed sex-linked nature of the origin of the abdominal abnormalities.

In *N. carpaticum* (Fig. 1), complex deformities affecting all the abdominal tergites, except for tergite I, have been noted. These anomalies are manifested by hemiatrophy, hemimery, enlargement of the tergite, and symphysomery (fusion of sclerites). Thus tergites II–IV and VII are characterized by hemimery and hemiatrophy, tergite V by enlargement, and tergites VI and VII by a combination of atrophy and symphysomery. Symphysomery is also manifested in tergites IX and X. As a result of the anomalies cited, the setal formulae are altered.

In the second specimen (Fig. 2), both the tergites and sternites of the posterior section of the abdomen are aberrant. Thus, two tergites (VI and VII) and three tergites (VIII–X) are fused together. The following anomalies have been found on the sternites of this specimen: hemiatrophy (sternites VIII and IX) and symphysomery combined with atrophy (sternites VIII–XI). The chaetotaxy of the



Figs. 1–3. *Neobisium carpaticum.* 1, Female, Mt. Avala, tergites I–X; scale bar = 0.5 mm. 2A, Male, Mt. Avala, tergites VI–X; scale bar = 1.0 mm. 2B, Same, sternites VII–XI. 3A, Female, Mt. Avala, tergites VIII–XI; scale bar = 0.5mm. 3B, Same, sternites VII–IX.

posterior abdominal segments is considerably disturbed because of these deformities; that is, the number and arrangement of setae differ considerably from those on the normal *N. carpaticum* (Ćurčić, 1977).

In the third specimen (Fig. 3), the posterior part of the abdomen is also affected by anomalies, but here the changes are less pronounced than in the other two specimens. Tergites IX–XI are fused together, while tergite X is reduced (Fig. 3A). In direct correlation with this phenomenon is the symphysomery which occurs on sternites VII–IX; these sternites are fused on the left (Fig. 3B).

The abdominal tergites of the pseudoscorpions analyzed are most frequently affected by hemimery and symphysomery (three cases each); while hemiatrophy and enlargement of the tergite is found in only one case each. Apart from this, combinations of hemimery and symphysomery (two cases), hemiatrophy and symphosomery (two cases), hemiatrophy and symphysomery (one case), and hemimery and enlargement of tergite (one case) have also been observed.

On the sternites of these anomalous pseudoscorpions, symphysomery alone was identified in one case, and combinations of hemimery, hemiatrophy, and symphysomery (one case), as well as of hemiatrophy and symphysomery (one case) were also noted.

Symphysomery was established mainly on the tergites of the posterior part of the abdomen. It is of interest, however, to point out that symphysomery of the ventral side of the abdomen also affects the posterior sclerites. The tergites toward the extremities of the abdomen are more susceptible to hemimery, hemiatrophy, and enlargement of the sclerites than the tergites of the mid-region. Hemimery, symphysomery, and hemiatrophy affecting the sternites were confined to the posterior abdominal segments.

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